WHAT IS CLAIMED IS:

1. A fuel injection equipment for a cylinder injection type and spark ignition type internal combustion engine that injects gasoline directly to a combustion chamber,

wherein the top angle at the point of fuel spray in the pressurized atmosphere of absolute pressure 0.5MPa is from -10° to 10° .

2. The fuel injection equipment according to claim 1, wherein the penetration of the lead fuel spray with the maximum spray penetration in absolute pressure 0.5MPa after 2.7 ms of the start of the injection is long compared with the distance between the fuel spray point of the fuel injection valve and sparking plug electrodes, the lead fuel spray being directed to the neighborhood of the sparking plug with fuel injection equipment installed in the internal combustion engine.

3. The fuel injection equipment according to claim 2, wherein the electrode of the sparking plug exists in the fuel spray existence angular range of said lead fuel spray when the angular range that said lead fuel spray exists on the circumference of the circle where centers on a central axis of the fuel injection valve and the position where the sparking plug electrode exists is assumed to be an fuel spray existence angular range in the fuel

spray horizontal section.

4. The fuel injection equipment according to any one of claims 1 to 3, further comprising a nozzle hole, a valve seat in the upstream side of said nozzle hole, the valve body which opens and shuts the fuel passage by acting on said valve seats, and driving means for said valve body, and further comprising swirl providing means that gives the swirl movement to the fuel in the upstream side of said nozzle hole,

wherein the stage difference is provided in the downstream aperture of said nozzle hole in the direction of the central axis line of the injection valve.

5. The fuel injection equipment according to claim 4, wherein at least one turn-ditch provided to the swirl providing means is a first turn-ditch where the sectional area of the flow path is larger than that of other ditches.

6. The fuel injection valve according to claim 1, wherein no turn-ditch is arranged in the opposing side of said first turn-ditch.

7. The fuel injection equipment according to claim 5, wherein the height of said first

turn-ditch is higher than the height of other ditches.

8. The fuel injection equipment according to claim 5, wherein the position of the injected fuel spray concentrated part a nd the position of the step of the nozzle hole opening are provided.

9. The fuel injection equipment according to claim 5, wherein said step of the nozzle hole opening has the angle of 0° to 30° .

10. The fuel injection equipment according to claim 1, wherein fuel injection valves which have a plurality of nozzle holes are combined.

11. The internal combustion engine of the cylinder injection type and spark ignition type that injects gasoline directly to the combustion chamber where the fuel injection equipment that the top angle at the point of fuel spray in the pressurized atmosphere of absolute pressure 0.5MPa exists in the range of -10° to 10° has been installed,

wherein the fuel spray injected from a plurality of nozzle holes of said fuel injection equipment is directed into the direction of the sparking plug.

12. The internal combustion engine according to claim 11, wherein the fuel distribution is biased from a central axis of the fuel injection valve to the region of the plug side.

13. A method of controlling a fuel injection equipment for the cylinder injection type and spark ignition type internal combustion engine that injects gasoline directly to the combustion chamber,

wherein the fuel is injected at the compression stroke of the internal combustion engine which installs the fuel injection equipment that the top angle at the point of fuel spray in the pressurized atmosphere of absolute pressure 0.5MPa exists in the range of -10° to 10° .

14. The method according to claim 13, wherein the engine is started by injecting the fuel at the intake stroke, and the injection of fuel is switched to compression stroke after the engine speed reaches that corresponding to the fast idling speed.